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Tibetan Sheep Wait Their Turn at the Barber's—The herdsman (left) brought his flock through Himalayan passes to barter shaggy coats for food grown in warmer India. Buyers clip the wool. The sheep, grain laden, will return home as pack animals—a role they share with roadless Tibet's yaks and mules.

(SEE BULLETIN NO. 2)

THOMAS WEIR

Despite the tea raisers, they still grow "an awful lot of coffee in Brazil." The giant country, larger than the United States, produces about two-thirds of the world's supply. It is the second-largest source of cacao. Cotton is also an important crop, as are rubber and fine hardwoods. Minerals include industrial diamonds, gold, copper, iron, and manganese. Carnauba wax has found markets for use in floor and shoe polishes and in making phonograph records.

Yerba maté, sometimes called Brazilian or Paraguay tea, is a drink made from a native plant and should not be confused with ordinary tea.

Industrial Boom—Industrially, Brazil is developing rapidly. Huge steel mills, hydroelectric power plants, aluminum mills, and chemical and drug plants have been built. From manufacturing comes almost two-thirds of the country's total production, with agriculture representing most of the balance. Total population has risen to more than 52,000,000.

Brazil first was named Vera Cruz, or True Cross, because it was Easter Sunday when Pedro Alvares Cabral, a Portuguese admiral, discovered it on April 22, 1500. After claiming the land for Portugal, he sent a ship to the homeland loaded, among other things, with red dyewood known as *pau-brasil*. The gatherers of this wood came to be known as *brasileiros*, and the country as *Brasil*. Brazilians still speak Portuguese.

Rio de Janeiro is the capital. It is a modern city with a population of 2,377,451—larger than Philadelphia. Its harbor is ranked as one of the most beautiful in the world (illustration, back cover).

Another United States—Brazil's full name is Os Estados Unidos do Brasil—the United States of Brazil. The country is divided into twenty States, a Federal District, and five Territories. Its Amazon River is 1,550 miles longer than the Mississippi. It and other large waterways make up an estimated 40,000 miles of navigable inland channels.

The southerly coastal areas of Brazil now are enjoying "June in January." This is not because of an unseasonable warm spell, but because, being in the Southern Hemisphere, the order of the seasons is the reverse of their arrival in the United States.

Brazil is unique in that, as a colony, it was also for a time the seat of Portugal's refugee government. To escape the invasion of the mother country by Napoleon's forces in 1808, the Portuguese court and many of the country's leading families fled to Brazil.

When Dom Joao returned to his throne in Portugal, his son Dom Pedro remained behind, eventually becoming constitutional Emperor of Brazil.

References—Brazil is shown on the National Geographic Society's map of South America. Write the Society's headquarters, Washington 6, D. C. for a map price list.

For further information, see "The Jungle Was My Home," in *The National Geographic Magazine*, November, 1952; "Jungle Jaunt on Amazon Headwaters," September, 1952; "Sea Fever," February, 1949; "Brazil's Land of Minerals," October, 1948; "Eclipse Hunting in Brazil's Ranchland," September, 1947; "Air Cruising Through New Brazil," October, 1942; and, in the GEOGRAPHIC SCHOOL BULLETINS, March 23, 1953, "Brazil May Shift Capital to Central Plateau"; and "Jungle Frontier Holds Wealth for Brazil," October 6, 1952. *(Issues of The Magazine not more than 12 months old are available to schools and libraries at a specially discounted price of 50¢ a copy. Earlier issues sell for 65¢ a copy through 1946; $1.00, 1930-1945; $2.00, 1912-1929. Write for prices of issues prior to 1912.)*

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UMI

ROGER KAHAN FROM RAPHO PICTURES

When Rubber Bounced from Brazil, Tea Raisers Brewed a New Industry—The domed and colonnaded opera house at Manaus is a glittering reminder of the glory and wealth that Brazil's native rubber brought up the Amazon in the early 1900's. The boom burst when Malaya and Indonesia seized the world's markets after transplanting rubber trees in their receptive soil. Now tea plants, imported from the Far East, are giving the huge South American republic a chance partially to even the score. The monument marks the opening of Brazil's river ports to world trade.

Bulletin No. 1, January 4, 1954

Tea from Brazil May Rival Coffee

Coffee-growing Brazil is making a determined effort to penetrate the world tea market, hitherto an almost exclusive preserve of the Middle and Far East.

This bid of Brazilian tea growers owes much to a farmer of Japanese lineage who introduced seeds of first-grade tea from Ceylon to his holdings in southern São Paulo in 1936. Earlier attempts, as far back as 1840, had met with only indifferent results on a commercial scale.

Tables Turned—In a sense, Brazilian tea raisers feel that they have turned the tables on the East Indians, who made themselves the world's largest natural-rubber producers with a start provided by a few seedlings smuggled out of Brazil's Amazon River basin.

Brazil's tea crop still is small—approximately 1,500,000 pounds a year—but the quality is good. World production of tea is estimated at 1,280,000,000 pounds annually. Americans import more than 93,000,000 pounds a year. Britain uses about eleven times as much tea per capita as does the United States.

supreme authority. According to reports, the Dalai Lama's ministers already have been dismissed.

With an area almost twice the size of Texas, Tibet is known to have rich deposits of coal, iron, and gold, and perhaps copper and uranium. In spite of its potential wealth, however, the mountain-girt nation has no modern industries, metallurgical, mining, or chemical. Neither has it hydroelectric power or electricity. There are no roads or railways. Goods —and travelers—are carried on the backs of yaks, mules, donkeys, and bullocks. Wheeled vehicles are unknown.

Tibet is hemmed in by the Himalayas to the south and west, the Kunlun Range on the north, and on the east by the rugged mountains of western China. It is the world's highest country. Its average level is above the 14,495-foot peak of Mount Whitney, California, the highest point in the United States.

Most of Tibet's 470,000 square miles are barren, and much of the country is unexplored. Violent winds sweep across the high plateaus. There is no irrigation, hence only a fraction of the land is cultivated.

In spite of this, the land supports the average Tibetan. Barley, corn, and cereals are the chief crops. Farming methods and implements are primitive; wooden stakes reinforced with iron serve as plows. Flour made from roast barley and mixed with butter is the staple food.

Caravans Carry on Busy Trade—A surprising variety of goods crosses Tibet's frontiers. Caravans plod across lofty mountain passes in the south to barter yak and sheep wool (illustration, cover), homemade carpets, shoes, and clothes for Indian silk and Burmese soap and candles. Spices and tea are brought in from China. A trickle of manufactured goods comes in from Britain and the United States.

Lamaism, a form of Buddhism which makes generous use of legend and superstition, is the state religion. Tibetans believe that ghosts and devils will meddle with their affairs unless appeased by a lama, as priests are called. These priests number more than 500,000—about one-eighth of the nation's population.

Nearly every village has a lamasery. Some house as many as 1,000 monks. The Dalai Lama lives in the fabulous Potala in Lhasa. This huge fortresslike palace, over 400 feet high and 900 feet long, was built in the 17th century by the fifth Dalai Lama. Within its 25-foot-thick walls miles of damp corridors link thousands of moldy rooms. On the roof rise tombs of departed Dalai Lamas, encrusted with gold leaf, pearls, and precious stones.

The present Dalai Lama is number fourteen. Mysterious rites and ceremonies are involved in the selection of a Dalai Lama to succeed one who dies. He may come from any walk of life and with his choice the members of his family, however poor and lowly, become members of Tibet's nobility, with government grants to maintain their new station.

References—Tibet appears on the Society's map of India and Burma.

For additional information, see "Caught in the Assam-Tibet Earthquake," in *The National Geographic Magazine* for March, 1952; "A Woman Paints the Tibetans," May, 1949; "Across Tibet from India to China," August, 1946; and, in the GEOGRAPHIC SCHOOL BULLETINS, April 7, 1952, "Communists Cope with Famine in Tibet"; and "Tibet Has Kept Its Isolation for Centuries," November 20, 1950.

UMI

BROOKE DOLAN, 2D, AND ILYA TOLSTOY

Wealthy Tibetans Deck the Idols in Their Temples and the Daughters in Their Homes with Fortunes in Gold and Precious Stones

Bulletin No. 2, January 4, 1954

Boy Lamas Vie for Tibetan Leadership

In remote Tibet, isolated "Forbidden Land" of central Asia, two youthful priests—the Dalai Lama and the Panchen Lama—have become pawns of world politics.

The 20-year-old Dalai Lama, son of Chinese peasants, still rules as the "living Buddha," spiritual and temporal head of some 4,000,000 people. He has been cordial to Westerners. During World War II he gave a friendly reception to American officials who presented him with gifts, including a photograph of President Roosevelt.

On the other hand, the slightly younger Panchen Lama is sponsored by the Chinese communists whose troops marched into Tibet in 1950. The Red overlords have given him a seat on their administrative council. They claim he is more important than the Dalai Lama.

Chinese Hope for Panchen Triumph—Tibetans believe each Dalai Lama to be the reincarnation of his predecessor, and to have been born at or near the time and place of the former's death. The Red Chinese, who now dictate Tibet's defense and foreign policies, apparently hope to break this tradition. This would permit them to raise the Panchen Lama to

Among Padre Island's assets are miles of beach with fine surf, excellent fishing, and a mild subtropical climate. A wealth of bird life gives the island added interest.

Once the home of cannibalistic Indians, Padre is named for Father (Padre) Nicolás Ballí, who held title to the island's 340,000 acres and operated a ranch. The ships of the French explorer La Salle, and the English sea rovers Sir John Hawkins and Sir Francis Drake, passed the long island. In later times, the keels of Jean Lafitte, the buccaneer, marked its sands. Troops under General Zachary Taylor and General Philip Sheridan found Padre's beaches the best route down the Texas coast during the Mexican War and the Civil War.

Traditions of buried pirate loot and shipwrecked gold have kept Padre Island's treasure seekers hopeful. Occasionally old coins are found, but beachcombers' prizes are more often curiously shaped and weathered driftwood or handsome seashells.

Salvage and Ranching Paid—Once salvage was a lucrative business on Padre, graveyard of many ships. Some salvagers reportedly were not averse to luring vessels aground with deceptive beacon lights.

Ranchers, who could swim and wade their cattle to mainland markets across the shallow sound, made stock raising another profitable business. Nourishing grasses as well as scrub trees grow on the dunes, and fresh rain water may be found by scooping shallow wells. Patrick Dunn, the self-styled "Duke of Padre Island," called it "the best cow ranch in the world." Another successful rancher there was John V. Singer, brother of the sewing-machine manufacturer, Isaac Merritt Singer.

Padre Island affords one of the most venturesome automobile drives in Texas. It is not recommended for a car traveling unescorted, nor for those unfamiliar with beach driving. From Corpus Christi the motorist crosses the causeway and reaches the northern end of the island. A hard-surfaced road leads south to the Nueces County line. From there, the beach provides the only highway. Smooth sands give way to tire-shredding shells for 15 miles, then the beach continues uninterruptedly to the southern tip. There, at present, the causeway to Port Isabel can be traveled only at low tide.

References—Padre Island is shown on the Society's map of the South Central United States.

For further information, see "America's 'Meat on the Hoof'," in *The National Geographic Magazine*, January, 1952; "Yield of Texas," February, 1945; "How We Use the Gulf of Mexico," January, 1944; "Down the Rio Grande," October, 1939; "Texas Delta of an American Nile," January, 1939; and "So Big Texas," June, 1928.

See also, in the GEOGRAPHIC SCHOOL BULLETINS, February 9, 1953, "President Was Born in Texas Cross Timbers."

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UMI

LUIS MARDEN

These Texans Enjoy Cheap and Seasickless Deep-Sea Fishing—Near Port Isabel two jetties, enclosing the ship channel, cross Laguna Madre toward Padre Island. Anglers made big strikes here; they have just landed the 450-pound jewfish lying behind them. Padre Island, acting as a natural breakwater, shelters these coastal waters of southernmost Texas.

Bulletin No. 3, January 4, 1954

Texas Building Resorts on Padre Island

Padre Island, with its legends of cannibals, cattlemen, and conquistadores' gold, hopes for a vacationland future as colorful as its past.

The sun-baked sand bar stretches 110 miles down the Texas coast of the Gulf of Mexico from Corpus Christi to the Rio Grande. Joining it on the north is Mustang Island, which adds 20 additional miles and is sometimes also referred to as Padre Island. Until recently, the "long white island" afforded few comforts to the hardy vacationists who liked to roam its dunes.

Ambitious Plans—Now there are ambitious plans for developing the north and south ends of pencil-slim Padre Island. In the north, Nueces County has built a causeway across the narrow Laguna Madre that separates isle and mainland. Three parks as well as other recreational facilities are being developed. At the southern tip, Cameron County is completing another causeway and plans additional parks.

there is any vegetation, from arctic areas and chilly mountain slopes to steamy tropical jungles and warm, swampy lowlands. Most live only a few days and usually stay close to home. Others migrate in great swarms —south in the autumn, north in the spring.

Famous for their global coverage are the Monarchs *(Danais plexippus)*. They are the most common species in the United States, but have spread from their native North America across the Atlantic to Europe and to most of the Pacific islands.

Transport System Is Top Secret—No one knows whether the Monarchs fly across these vast distances under their own power or whether they take passage on ships. The latter course seems more probable. The Camberwell Beauty (Mourning Cloak, *Nymphalis antiopa*, in the United States) is almost certain to have migrated from Finland to England in pine logs that were to be used for pit props in mines.

Another world citizen, the Painted Lady *(Vanessa cardui)*, is found from Mexico to Canada, and from Africa north across Europe. She penetrates even the Iron Curtain, drifting through the Caucasus, across Russia to the Arctic Circle.

Scientific names have been given to more than 50,000 species of butterflies. Popular designations often vary with locality and are usually descriptive. Swallowtails have taillike projections on their hind wings. Certain wing patterns resemble animals—hence the Tiger Swallowtail and the Zebra Swallowtail. Numerous species take their names from their wing colors—the Coppers, Blues, and Sulphurs (or Yellows). The predominance of butter yellow gives butterflies their general name.

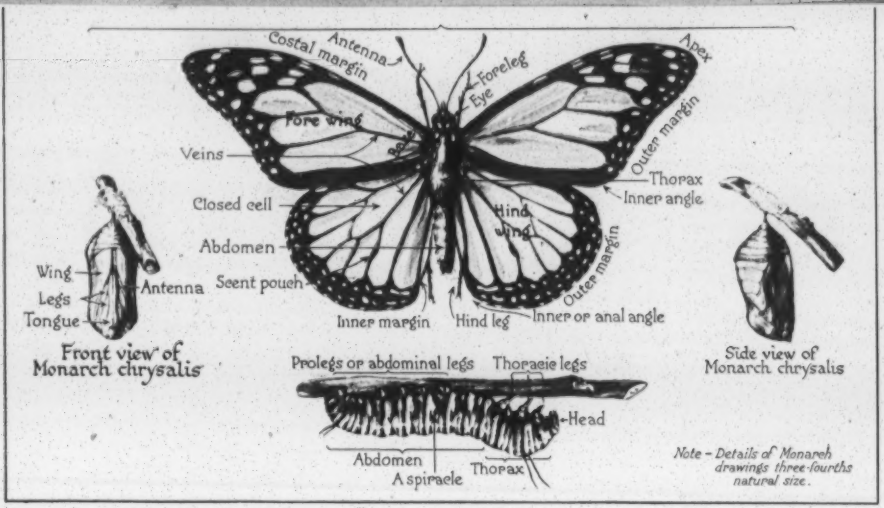
Some species can be identified by the way they fly. The Monarch soars with a graceful sailing motion from milkweed to milkweed, its favorite food. The Buckeye darts rapidly; the Viceroy flaps, then glides.

The butterfly goes through four distinct changes. This is known as metamorphosis, from the Greek meaning "change of form." From egg to larva (caterpillar) to chrysalis (pupa) to full-grown butterfly it develops. After it bursts forth as a butterfly, it grows no more. It maintains throughout its short life the same wing spread with which it alighted for its first sip of a flower.

ANELLA DEXTER

Into the Wild Blue Yonder a Black-Veined Monarch Takes Off from a Milkweed Base

References—See also "Back-yard Monsters in Color," in *The National Geographic Magazine*, August, 1952; "Butterfly Travelers," May, 1937; and "Who's Who Among the Butterflies," May, 1936.



DRAWING BY HASHIME MURAYAMA

From Lowly Worm to Flying Monarch—From the tiny egg (not shown in chart) comes the crawling caterpillar (larva) which eats its weight in milkweed many times over, outgrowing one shell after another. When full grown it goes on the inactive list as a chrysalis (or pupa). It no longer moves or even eats. Inside the shell the tissues develop into the organs of a butterfly. When growth is finished, the shell breaks and out flies the adult Monarch butterfly.

Bulletin No. 4, January 4, 1954

Butterfly Merits "Flying Flower" Nickname

When is a Monarch not a ruler, an Admiral not a naval officer, and a Grayling not a fish? Answer: When they flutter and dart from flower to flower. In short, when they are butterflies.

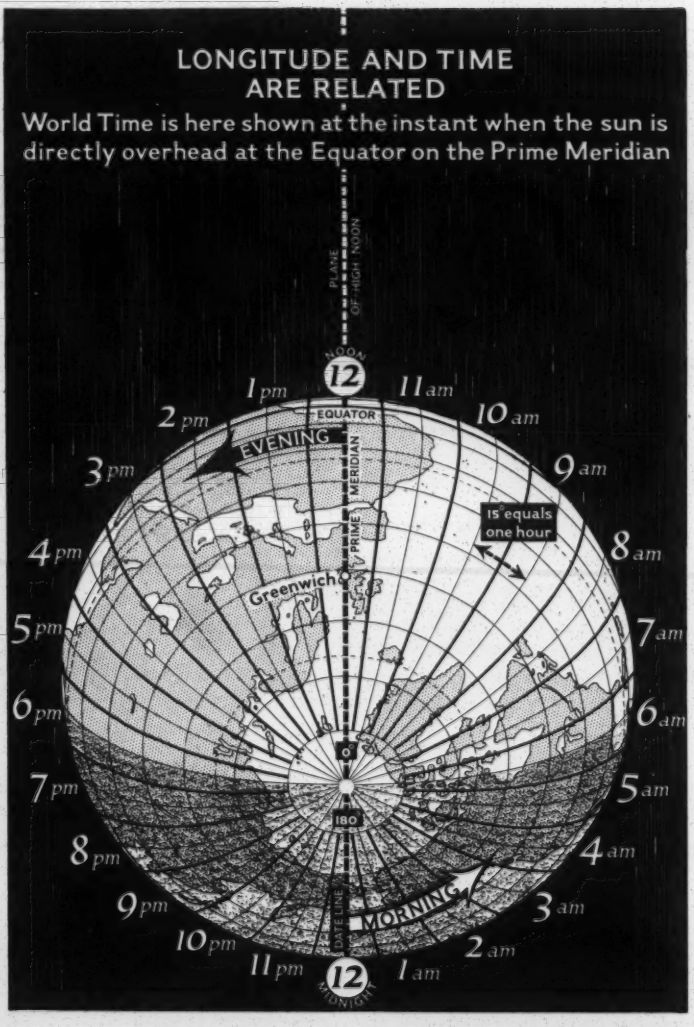
The butterfly has long been a synonym for idle, useless beauty, although the ancients took this "flying flower" of the insect world quite seriously. To them it symbolized the human soul. Butterflies appeared on Greek coins two centuries before the Christian era, and were carved on stone in the early days of the Roman Empire.

The four-winged creature still is more ornamental than useful. When it has helped the bees and flies pollinate a few plants, its lifetime work is done. But after death its brilliant wings live on in retail art. Gold, brown, green, blue, iridescent—they appear on lamp shades, screens, and jewelry. Under glass, they ornament trays and box lids.

Family Resemblance Is Strong—It is sometimes hard to tell a butterfly from a moth, which belongs to the same family—the Lepidoptera. Both have powdery wings, but the butterfly generally has antennae that end in a club, or knob, while the moth's antennae are threadlike. The butterfly's body is slim, the moth's thick. The butterfly usually flies by day, the moth by night. When resting, the butterfly nearly always holds its wings straight up; the moth spreads them out flat.

Museums and wealthy collectors occasionally pay high prices for butterflies. A pair of Schaus' Swallowtails, a rare species found in Florida, has brought as much as $150. But many varieties are within the reach of every schoolchild who can make a net from a loop of wire, a piece of cheesecloth, and a stick for a handle.

The fragile flyers flit from plant to plant in almost every region where



One Place Name Graces This Globe—Greenwich

From the prime meridian, which runs through Greenwich, England, world time is measured. In actual practice, time zones, rather than strictly following meridian lines as this chart shows, often are adjusted to follow political borders or to meet other practical requirements. An inset on the National Geographic Society's Map of the World shows the internationally accepted time zones.

Greenwich (the old site) will remain the zero meridian from which longitude and time are measured. To allow for the one-third degree longitudinal difference between Greenwich and the new site, fourteen and a half miles east of the Greenwich meridian, scientists will subtract about a minute and a half from observed time. The time is calculated by observation through telescopes of sun, moon, and stars.

References—Herstmonceux may be located on the Society's map of the British Isles.

For additional information, see "Split-second Time Runs Today's World," in *The National Geographic Magazine*, September, 1947; "Time and Tide on the Thames," February, 1939; and "Penn Country in Sussex," July, 1935.

See also, in the GEOGRAPHIC SCHOOL BULLETINS, January 27, 1947, "Greenwich Observatory is Moving to Country."

The Round Earth on Flat Paper

Among many special books published by the National Geographic Society, *The Round Earth on Flat Paper* is often sought out by teachers for its down-to-earth, easy-to-understand treatment of map projections. The 126-page monograph, profusely illustrated by photographs and drawings, also traces map making from ancient times. Seventy-five cents.

UMI

Bulletin No. 5, January 4, 1954

Greenwich Observatory Flees London Smog

Smog, scourge of many cities, recently brought twilight at noon to London and last year caused the death of almost 4,000. Another casualty of the smoke-plus-fog of the British capital is Greenwich Observatory, base point for the globe's meridians and setter of the world's clocks.

Now being moved to a new location in Herstmonceux Castle, the Royal Greenwich Observatory, as it continues to be called, will make allowances in its observations so that the world's time and space measurements will not be changed. Herstmonceux is in Sussex, 45 airline miles southeast of London.

London Has Engulfed Observatory Village—Greenwich was a country village down the Thames from London when Sir Christopher Wren designed the Royal Observatory 279 years ago, but the expanding metropolis since has completely engulfed it.

In recent decades, meteorological and astronomical operations have been seriously hampered by industrial smog. Smoke blinded the telescopes and covered lenses with soot, and fog corroded metal parts. Also electric railways interfered with magnetic observations. The glare of street lights and neon signs outshone the Milky Way, fogging photographic plates.

In pastoral Sussex, observatory officials will have no such problems. Secluded Herstmonceux (sometimes spelled Hurstmonceux), built in 1440, has been described as "the last and most beautiful example of the domestic castle in the Middle Ages." A huge red brick mansion more than 200 feet square, it is complete with moat, drawbridge, portcullis, crenellated towers, dungeon, and the "ghost" of a girl whose governess, according to legend, starved her to death decades ago.

The 500-year-old castle sits among 370 acres of wooded countryside, only seven miles from the battlefield of Hastings where William the Conqueror led the Normans to victory over the Saxons in 1066. It lay in disrepair until 1929 when private owners restored it and later sold it to the Admiralty for a fraction of the restoration cost.

Dates from Reign of Charles II—The Greenwich Observatory was established by the order of King Charles II in 1675, and its site has served as England's prime meridian since 1800.

Until 1884, however, Paris, Washington, and other capital cities marked the zero meridian in their respective countries. In that year, representatives of twenty-five nations attending the Washington Meridian Conference agreed upon Greenwich as the world's official marking point for the prime meridian (zero degrees, zero minutes, zero seconds).

Moving the huge and delicate instruments of the Royal Observatory makes a difficult rehousing project. To complete the transfer, begun in 1947, will require 10 years. When observations begin at the new site, possibly this month, Britain's oldest scientific institution will no longer function astride the Greenwich prime meridian. This does not mean that meridian lines will be changed, maps made obsolete, and global timekeeping scrambled.

PAULO EINHORN

Waves of the Atlantic Foam White Around the Three-Mile Crescent of Rio's Copacabana Beach

Cariocas, as residents of Rio de Janeiro are called, delight in bathing the year round at the famous beach. Vacationists who "go rolling down to Rio" relax in sun and surf only fifteen minutes from the heart of the city. Hotels and apartment houses line the drive. At its outer edge a walk set with ornamental tiles copies the plaza pavements of Lisbon, capital of Portugal, mother country of Brazil (Bulletin No. 1).